Science on the Hill: Protecting grid from cataclysmic solar storm

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by Jesse Woodroffe and Michael Rivera

When the last really big solar storm hit Earth in 1921, the Sun ejected a burst of plasma and magnetic structures like Zeus hurling a thunderbolt from Mount Olympus. Earth’s magnetic field funneled a wave of electrically charged particles toward the ground, where they induced a current along telegraph lines and railroad tracks that set fire to telegraph offices and burned down train stations. As ghostly curtains of Northern Lights danced far south over the eastern United States, the fledgling electric grid flickered and went dark.

Almost a century later, today’s grid is bigger, more interconnected and even more susceptible to a solar storm disaster. No one knows exactly how susceptible, but one recent peer-reviewed study found that an epic solar, or geomagnetic, storm could cost the United States more than $40 billion in damages and lost productivity.

Most geomagnetic storms are harmless. They regularly lash across Earth after a coronal mass ejection sprays electrons, protons and other charged particles from the Sun. If they’re aimed just right, a few days later Earth’s magnetic field snares them. They accelerate and light up in another brilliant — and harmless — display of Northern Lights (or Southern Lights below the equator).

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